

## Tailored nutrition key to raising nitrogen use efficiency

Growers looking to reduce cost pressures on their business should be examining the fertiliser applications they have planned in the spring to ensure it contains the nutrients that the crop and soil need.

While some view scaling back on secondary and micronutrients the easiest way to save some cash when fertiliser prices are high, not applying these essential nutrients could mean valuable nitrogen isn't taken up to its greatest potential.

Getting a better understanding of how nutrients interact with each other will help inform choices for the year ahead and Toby Ward, nutrition agronomist for Origin Fertilisers, says making the most of what growers are applying should be the goal this season.

"In a year such as this, farmers should be questioning if the type of fertiliser they are applying is right for the soil and the crop, as the most expensive fertiliser is the wrong fertiliser. There is no hard and fast rule book as every field is different and we need to be managing what is in our control to make better use of any nutrition we apply," says Mr Ward.

This approach starts with knowing what the soil needs through a broad-spectrum soil analysis. Matching this data to prescription fertiliser requirements will help correct nutrient shortages and should be viewed as a more efficient use of fertiliser to maintain a synergy in the soil. "Yield is proportional to the amount of the most limiting nutrient, so raising the levels of this nutrient will help increase soil health and yield," adds Mr Ward.

### Molybdenum's key role

Recent trials have shown that one of the key micronutrients in improving nitrogen use efficiency (NUE) is molybdenum. Growers may be familiar with applying this nutrient as a foliar – partly down to the small quantities that are required – however, this type of application only targets the plant and Mr Ward says advantages have been seen from coating fertiliser granules with molybdenum.

"Through our recent trial work, we have evidence to suggest that targeting where and how molybdenum is applied has a positive impact on yield and any return on investment. This is due to the soil bacteria using molybdenum as a catalyst to increase nitrogen efficiency."

Trials over the past two growing seasons evaluating molybdenum applied as a fertiliser coating to crops of spring barley, winter wheat and oilseed rape all delivered yield increases when compared with a standard fertiliser programme on the same area. The return on investment was as high as 6:1 in the spring barley crop.

Of equal significance are the results from the oilseed rape trial, which also compared an application of a foliar molybdenum spray at T1 growth stage in addition to the fertiliser programme, and Mr Ward says the results showed increases in key areas.

"When using the granular fertiliser coated with molybdenum, oilseed rape yield increased by 2.3% compared to the fertiliser only, and by a bigger 3% margin when compared to the area that received a foliar molybdenum spray. When molybdenum was applied to the nitrogen, uptake rose by 5.4% and increased NUE by 4.5%."

Molybdenum is a naturally occurring metal and a catalyst that sparks a reaction in soil bacteria enzymes to stimulate the nitrification process, and Mr Ward says having good molybdenum levels helps the conversion in the plant of raw nitrogen into protein.

“Molybdenum aids the conversion of nitrogen from ammonium to nitrate, so the plant can access it in an easier form. By coating the nitrogen granules, the molybdenum is in the right place to act as the catalyst with the nitrogen as soon as it starts to dissolve.”

### **Polysulphate can fill sulphur requirement**

Although growers may be focussed on securing supplies of straight nitrogen, it is worth remembering the role sulphur plays in soil nutrition and overlooking it will mean any nitrogen applied won't be fully available to the plant.

“Sulphur is essential for protein formation and has a key role in improving crop quality,” says Mr Ward. “Crops with a high nitrogen need, such as milling wheat, will have increased sulphur requirements as its presence helps increase nitrogen use efficiency.”

As sulphur is prone to leaching due to its high mobility in the soil, it is unlikely there will be enough soil reserves to supply the crop, so regular applications are essential. Growers should be aiming to apply 1kg of sulphur for every 12kg of nitrogen in a wheat crop.

Sulphur has greatest efficacy if it is applied little and often alongside nitrogen throughout the season, but it is worth noting that a late application will still enhance the uptake of nitrogen as opposed to no application at all.

“A 100kg application of Polysulphate (48%SO<sub>3</sub>, 14K<sub>2</sub>O, 17%CaO, 9%MgO) would supply around 48kg of SO<sub>3</sub> to the growing crop over the course of the season – enough for most cereal crops according to RB209. Polysulphate is released over 55-days after application, much slower than other sulphur products, so it is available for longer,” concludes Mr Ward.